

REMARKS

The following remarks address rejections and comments made in the Office Action mailed October 9, 2008. Claims 1-19 are currently pending. Claims 1-7 and 10-19 are currently amended, and no claims have been cancelled. In light of the foregoing amendments and the following remarks, the applicants respectfully request reconsideration of the present case in view of the following remarks.

Claim Amendments

The claims were amended to clarify that the claimed volume rendering is three-dimensional. These amendments are consistent with the scope and use of the term "volume rendering" as used in the specification and are not intended to narrow the original intended scope of the claims in any way. Support for these amendments can be found in the specification in at least page 9, lines 4-6; page 12, lines 6-12; and page 13, lines 8-17.

The claims were also amended to clarify that the claimed real time is with respect to the act of collecting MRI data from a magnetic resonance coil. These amendments are consistent with the scope and use of the term "real time" as used in the specification and are not intended to narrow the original intended scope of the claims in any way. Support for these amendments can be found in the specification at least on page 7, lines 4-6; page 6, lines 19-20; page 13, line 19-page 14, line 21; and Figured 1 and 2.

Claims 13, 18, and 19 were also amended to correct the antecedent basis for the term "act."

Claim Objection under 35 U.S.C. § 101

Claims 1-18 were rejected under 35 U.S.C. § 101 because the claimed invention is directed to non-statutory subject matter. Applicants respectfully traverse this rejection and do not concede any characterization of the cited reference or the pending application set forth in the Office Action.

The United States Court of Appeals for the Federal Circuit has ruled that the test for determining whether a process claim covers patentable subject matter is whether the process is either (i) tied to a particular machine or (ii) apparatus or it transforms a particular article to a different state or thing. In re Bilski, No. 08/833892 (Fed. Cir. Oct. 30, 2008), slip op. at 10.

Under this test, the court has ruled that producing an image from x-ray data is a transformation of matter to a different state or thing and thus the process is patentable subject matter. See id., slip op. at 26 (discussing In re Abele, 684 F.2d 902, 908-09 (C.C.P.A. 1982)).

Claims 1-8 all include the acts analogous to the patentable subject matter of the Abele claims, including collecting MRI data and then producing a three-dimensional rendering of a volume from the MRI data. Furthermore, even if these actions did not transform an article to a different state, the claims still are tied to a computer and a magnetic resonance coil, which are machines.

Therefore, the applicants respectfully submit that claims 1-18 are directed to patentable subject matter and request withdrawal of the pending rejection.

Anticipation Rejection under 35 U.S.C. § 102

Claims 1-3, 5, 7-13, and 17-19 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Boernert et al. (US 6,317,619). The applicants respectfully traverse this rejection, and do not concede any characterization of the cited reference or the pending application set forth in the Office Action.

Claim 1 (and hence dependent claims 2-3, 5, 7-13, 17, and 18) sets forth, “producing a three-dimensional rendering of a volume from the MRI data in real time with respect to the act of collecting MRI data representative of shapes within the image volume.” Claim 19 similarly sets forth, “a computer . . . configured to receive the MRI data from the MRI scanner and to produce a three-dimensional rendering of a volume from the MRI data in real time with respect to an act of collecting the MRI data from the magnetic resonance coil.”

Boernert does not disclose a three-dimensional rendering of a volume. In response to Applicants previous arguments, the Office Action states:

Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. Since Boernert ('619) clearly teaches means and steps for generating an image (i.e., a rendering) of a three dimensional volume (see for example col. 14 lines 52 "3D volume to be imaged"), it meets the limitation of a "volume rendering".

Page 5, paragraph 10. This statement raises two issues regarding the volume rendering.

First, importation into the claims of limitations from the specification. The applicants' previous arguments did not import limitations into the body of the claim from the specification.

It merely argued that the definition “volume rendering” is a three-dimensional image and discussed teachings from the specification that support that definition. The claims were amended to clarify that the originally intended definition of “volume rendering,” as it is used in the specification, is a three-dimensional rendering of a volume.

Second, the disclosure of Boernert. The Office Action cited this reference’s disclosure about the “3D volume to be imaged.” This disclosure refers to the object that is being imaged. It does not refer to the image itself. In contrast, the pending claims refer to the actual rendering or image.

Boernert fails to disclose a three dimensional rendering of a volume. Therefore, the applicants respectfully submit that the pending claims are novel and request withdrawal of the pending rejection.

Obviousness Rejections under 35 U.S.C. § 103

Boernert in view of NessAiver

Claims 4 and 6 stand rejected under 35 U.S.C. § 103(a) as being obvious over Boernert in view of NessAiver (US 5,329,925). The applicants respectfully traverse the rejection and do not concede any characterizations of the cited reference or the pending application set forth in the Office Action.

Claims 4 and 6 depend from claim 1 and include the element, “producing a three-dimensional rendering of a volume from the MRI data in real time with respect to the act of collecting MRI data from a magnetic resonance coil representative of shapes within the image volume.”

As discussed above, Boernert fails to teach or suggest producing a three-dimensional rendering in real time with respect to collecting MRI data from a magnetic resonance coil. NessAiver also fails to teach or suggest this element. NessAiver is directed to reducing scan time of magnetic resonance cine images, but does not teach or suggest producing volume renderings or producing such renderings in real time with respect to the collection of data.

Therefore, no combination of Boernert and NessAiver can result in the claimed invention. The applicants respectfully submit that claims 4 and 6 are not obvious in view of these cited references and request withdrawal of the pending rejection.

Boernert in view of Pfister

Claims 14 and 15 stand rejected under 35 U.S.C. § 103(a) as being obvious over Boernert in view of Pfister (Architectures for real-time volume rendering, 15 Future Generation Computer Systems 1-19 (1999)). The applicants respectfully traverse the rejection and do not concede any characterizations of the cited reference or the pending application set forth in the Office Action.

Claims 14 and 15 depend from claim 1 and include the element, “producing a three-dimensional rendering of a volume from the MRI data in real time with respect to the act of collecting MRI data from a magnetic resonance coil representative of shapes within the image volume.”

As discussed above, Boernert fails to teach or suggest rendering a volume in real time with respect to collecting MRI data from a magnetic resonance coil. Pfister also fails to teach or suggest this element. Pfister is directed to mapping texture on volume renderings. With respect to real time, the only disclosure is at col. 2, lines 14-18, which states only that hardware accelerators aim to provide real-time frame rates when operating on previously collected data — not that it provides real-time volume renderings with respect to MRI data collected in real time. Nor does it teach how the system would achieve real-time frame rates.

Pfister discloses imaging based on previously collected data, while the pending claim covers imaging based on data as it is being collected from a coil. Pfister actually teaches away from the claimed invention.

Therefore, no combination of Boernert and Pfister can result in the claimed invention. The applicants respectfully submit that claims 14 and 15 are not obvious in view of these cited references and request withdrawal of the pending rejection.

Boernert in view of Deering

Claims 15 and 16 stand rejected under 35 U.S.C. § 103(a) as being obvious over Boernert in view of Deering et al. (US 6,417,861). The applicants respectfully traverse the rejection and do not concede any characterizations of the cited reference or the pending application set forth in the Office Action.

Claims 15 and 16 depend from claim 1 and include the element, “producing a three-dimensional rendering of a volume from the MRI data in real time with respect to the act of collecting MRI data from a magnetic resonance coil representative of shapes within the image volume.”

As discussed above, Boernert fails to teach or suggest rendering an image in real time with respect to collecting MRI data from a magnetic resonance coil. Deering also fails to teach or suggest this element. In fact, Deering teaches away from the claimed invention. Deering teaches a graphics architecture that constructs images from previously acquired data. Real-time for the Deering architecture is a function performed at or near the refresh rate of a display device, col. 4, lines 35-37, not with respect to the collection of data. It does not make any disclosure about magnetic resonance imaging or MRI data.

Therefore, no combination of Boernert and Deering can result in the claimed invention. The applicants respectfully submit that claims 15 and 16 are not obvious in view of these cited references and request withdrawal of the pending rejection.

SUMMARY

In view of the foregoing amendments and remarks, the applicants respectfully submit that the pending claims are allowable over the cited references and request issuance of a Notice of Allowance. The applicants also note that there may be reasons and arguments that the pending claims are allowable in addition to those discussed herein and reserve the right to raise any such reason or argument in the future. Please contact the undersigned attorney with any questions regarding this application.

Respectfully submitted,

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